

Pamela F. Faggert
Vice President and Chief Environmental Officer



5000 Dominion Boulevard, Glen Allen, VA 23060
Phone: 804-273-3467

November 24, 2010

Ms. Anita Rigglesman
Virginia Department of Environmental Quality
PO Box 3000
Harrisonburg, VA 22801

Re: Comments of Virginia Electric and Power Company
Warren County Combined Cycle Project
Prevention of Significant Deterioration Permit
Registration No. 81391
Plant ID No. 51-187-0041

Dear Ms. Rigglesman:

Dominion is pleased to submit the attached comments on the above referenced project, in addition to the comments submitted earlier today.

If you have any questions regarding these comments or any other questions relating to the proposed facility, please contact Andy Gates at 804-273-2950 or andy.gates@dom.com.

Sincerely,

A handwritten signature in blue ink that reads "Pamela F. Faggert". The signature is written in a cursive, flowing style.

Pamela F. Faggert

Enclosure

Supplement for NO_x BACT - Warren County Combined-Cycle Project – Dominion Energy

This is a supplement to the BACT determination submitted with the original application. The top level of control for natural gas fired combined cycle gas turbines is selective catalytic reduction (SCR). In addition, the draft permit requires the use of two-stage, lean pre-mix dry low-NO_x combustors as well as good combustion practices to minimize emissions. There are no additional controls that could be applied to these units. As shown in the current EPA'S RACT/BACT/LAER Clearing House, numerous projects have been permitted in the 2.0 to 3.0 ppmvd at 15% O₂ range with averaging times ranging from 1-hour to an annual average. In the 2007 to 2009 time frame, approximately ten projects were permitted at 2.0 ppmvd at 15% O₂, including two LAER determinations. One project was permitted at a NO_x emission rate of 1.5 ppmvd at 15% O₂ in the year 2000. However, this project was never built and 1.5 ppmvd at 15% O₂ has not been demonstrated as achievable in practice.

To demonstrate compliance, an operating facility must have some compliance margin. Thus, to be in continuous compliance with any emission rate, the facility will have to consistently perform below that rate. Catalyst manufacturers must produce a product that will exceed the efficiency required to have a product that will have a reasonably useful life since the activity of the catalyst will degrade with time, reducing the efficiency from the initial time it is placed in service, thus requiring the replacement of the catalyst over time when it can no longer perform at an acceptable efficiency.

Emission rates below 2.0 ppmvd at 15% O₂ will require the catalyst of the SCR assembly to achieve continuous removal of NO_x at a rate greater than 88% removal. Catalyst removal efficiency is not consistent over the life of the catalyst and depends on the following factors:

1. Catalyst must have uniform flow through the catalyst bed to achieve consistent contact with the flue gas.
2. The ammonia must have perfect distribution before the catalyst bed to provide uniform coverage of the catalyst face.
3. Sufficient quantities of ammonia must be provided to react with the NO_x in the flue gas without excessive ammonia slip.
4. The temperature of the flue gas must be within the range of the catalyst for optimal performance.
5. There must be sufficient contact time in the presence of the ammonia and the catalyst with the flue gas for the reaction to occur.
6. Steady operation of the unit must be maintained to allow for optimal tuning of the system.

In a well-engineered, operating combined cycle turbine unit, these criteria are optimized to achieve maximum efficiency of the SCR; however, perfection has not yet been achieved and thus demonstrated. After hundreds of thousands of hours of operation, it has been demonstrated that an emission rate of 2.0 ppmvd at 15% O₂ will allow a well-run combined-cycle facility to operate in compliance with a reasonable SCR operating life and a reasonable ammonia slip limit. The design of this unit has already been enhanced to minimize the ammonia slip, as the plant is designed to follow the electrical load dictated by the PJM system operator.

The addition of more catalyst to attempt to get longer contact with the flue gas has environmental consequences for the unit. The additional catalyst would result in additional pressure drop for the combustion turbine causing it to produce less power. Combustion turbines are volumetric machines and, therefore, their efficiency is very sensitive to increased back pressure. Thus, to produce the same amount of power, additional emissions from the extra fuel being burned will be emitted.

Practical considerations as well as the conclusions from the "Top Down BACT" analysis dictate that the case-by-case BACT for NO_x for the Warren County Combined-Cycle Project is 2.0 ppmvd at 15% O_2 on a 1-hour basis.